cold. The reports from the new stations at North Head and Tatoosh Island were of great value in giving early information of approaching storms, and no storms entered the district without ample warning having been sent to marine interests. Shipping was badly hampered by gales, but no serious casualties occurred.—*E. A. Beals, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocity.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	31, p. m.*	41	124	3, a. m..	37	97	1,500	2.0	750	31.2
II	4, p. m..	53	108	9, a. m..	46	60	3,150	4.5	700	29.2
III	9, p. m..	53	108	11, p. m..	41	72	1,900	2.0	950	39.6
IV	12, a. m..	53	105	13, a. m..	44	100	650	1.0	650	27.1
V	12, a. m..	45	123	13, a. m..	44	100	1,125	1.0	1,125	46.9
VI	14, p. m..	45	118	20, a. m..	42	75	3,400	5.5	618	25.8
	15, a. m..	50	100				2,875	5.0	575	24.0
VII	21, a. m..	47	123	24, a. m..	34	78	2,600	3.0	867	36.1
VIII	24, p. m..	45	123	29, p. m..	41	70	3,500	5.0	700	29.2
IX	28, p. m..	43	103	30, p. m..	39	82	1,750	2.0	875	36.5
Sums							22,450	31.0	7,810	325.6
Mean of 10 paths							2,245		781	32.6
Mean of 31.0 days									724	30.2
Low areas.										
I	1, a. m..	38	105	3, p. m..	48	68	2,000	2.5	800	33.3
II	2, a. m..	51	120	4, p. m..	46	85	1,650	2.5	660	27.5
III	3, p. m..	29	95	7, a. m..	47	65	2,200	3.5	629	26.2
IV	6, p. m..	51	120	8, p. m..	49	86	1,800	2.0	900	37.5
V	10, p. m..	41	112	15, p. m..	48	68	3,275	5.0	655	27.3
VI	12, a. m..	47	96	13, p. m..	45	80	900	1.5	600	25.0
VII	14, a. m..	35	112	18, a. m..	42	80	2,350	4.0	588	24.5
				18, p. m..	35	75	2,550	4.5	567	23.6
VIII	23, p. m..	32	107	28, p. m..	46	60	3,175	5.0	635	26.5
IX	26, p. m..	53	114	30, p. m..	46	60	2,550	4.0	638	26.6
	27, p. m..	38	105				2,450	3.0	788	32.8
Sums							24,900	37.5	7,460	310.8
Mean of 11 paths							2,264		678	28.2
Mean of 37.5 days									664	27.7

*October.

For graphic presentation of the movements of these highs and lows see Charts I and II.—*Geo. E. Hunt, Chief Clerk, Forecast Division.*

RIVERS AND FLOODS.

The occurrences of interest in connection with the river work of the month were but three; 1, the formal opening of the New England branch of the River and Flood Service; 2, the floods in the Southwest; and 3, the moderate flood in the upper Sacramento Valley.

The New England River and Flood Service was established at the urgent request of the business interests of that section in the hope that, after a series of observations had been made, some system might be devised whereby warnings of approaching floods, ice gorges, etc., could be given a sufficient time in advance to admit of the removal of property to places of safety, and of the application of any preventive measures that might be found to be practicable. The headquarters of the new service are located at Boston, and following are the names of the stations established; they were selected after a personal inspection of the entire territory and a due consideration for all interests likely to be affected at any time.

PENOBSCOT RIVER.

River stations.	*Rainfall station.*
Mattawamkeag, Me.	Millinocket, Me.
Montague, Me.	
Bangor, Me.	

KENNEBEC RIVER.

River stations.	*Rainfall stations.*
Solon, Me.	Kineo, Me.
Winslow, Me.	Jackman, Me.

MERRIMAC RIVER.

River stations.	*Rainfall station.*
Franklin Junction, N. H.	Plymouth, N. H.
Concord, N. H.	
Manchester, N. H.	

CONNECTICUT RIVER.

River stations.	*Rainfall stations.*
Wells River, Vt.	West Stewartstown, N. H.
White River Junction, Vt.	North Stratford, N. H.
Bellows Falls, Vt.	
Holyoke, Mass.	
Hartford, Conn.	

HOUSATONIC RIVER.

River station.	*Rainfall station.*
Gaylordsville, Conn.	Pittsfield, Mass.

This service will be maintained from November to April, inclusive, of each year, with a special service during the remaining months whenever necessary.

The floods in Texas and in the Red River Valley were due to the persistent heavy rains of the latter half of the month over the territory affected. The great extent of the Texas and Indian Territory floods is not at all indicated by the stages of the water in the larger rivers. They were comparatively, though not extremely, high, the Trinity River leading, but the rains were so frequent and excessive that the whole country became saturated with water. Lakes, ponds, and small streams were entirely filled and overflowed their banks, and the ground became burdened with water. In some portions of the districts affected the rains appear to have been more of a benefit than a detriment, while in others the reverse was true. The greatest sufferers were the railroads. Culverts and bridges were washed away, and many miles of tracks settled in the soft ground, necessitating vexatious delays and frequently the entire abandonment of train service. Some late cotton was ruined and quite a number of cattle were drowned in the bottom lands.

The Red River flood was still increasing at the end of the month, and it will be the subject of a special report in the WEATHER REVIEW for December, 1902.

The flood in the upper Sacramento Valley was caused by the heavy rains of the 8th and 9th. At Red Bluff, Cal., the river was out of its banks on the 9th, and warnings were sent to the lower river points to move stock and portable property to higher ground. The maximum stage reached at Red Bluff was 24.2 feet, 1.2 feet above the danger line. The rise was not prolonged, and by the 13th the water had fallen below the 6-foot mark.

Navigation on the Tennessee River above Florence, Ala., was resumed on the 26th after a suspension of over five weeks. Over the remaining navigable rivers conditions did not materially change.

Very little ice has thus far been reported. At Moorhead, Minn., the Red River of the North was frozen over in places on the 12th, and remained so at the close of the month.

The highest and lowest water, mean stage, and monthly range at 156 river stations are given in Table VII. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Forecast Official.*